

§7. Compilation of Chronology Based on NIFS Fusion Science Archives

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Chronology of fusion research has been continuously compiled, to the total number of around 2,400 historical facts. In compiling chronology this year, the focus was made on the following points, that is, the early period of the fusion research in Kyoto University, especially Heliotron A, and the development of fusion reactor technology in Japan.

The chronology has been compiled based on the NIFS Fusion Science Archives (FSA), however, the interview with the prominent astronomer well known for the Hayashi-phase on the birth of stars, Chushiro Hayashi, professor emeritus of Kyoto University, who had been involved in fusion research in 1950s, provided supportive evidences on Heliotron A in Kyoto University. K. Kimura and S. Hanaoka joined the interview that was conducted under the collaboration with SOKENDAI project "History of Inter-University Institutes and Archives". Time-line of early fusion research in Kyoto Univ. is shown in Table I. Generally speaking, fusion research in Japan has started after The 1st International Conference on Peaceful Uses of Atomic Energy, but Hayashi told that there had been already a study group before the conference on nuclear phenomena in the cosmos in Yukawa Institute for Theoretical Physics, which made researchers in various fields consequently set up nuclear fusion research. In 1957 when Hayashi was promoted to professor of nuclear physics, he called diverse researchers beyond department of physics into the collaboration program of Heliotron A experiment. Although he belonged to the theoretical physics and needed few budget, he contributed one million yen of lecture expenses for the project and suggested to make a device. The circular tube of vacuum chamber was made of ceramics. Those days it was difficult to make some holes for observation equipment on the ceramics vacuum chamber from the viewpoint of high-vacuum seal, as a result, useful data were not gained at the experiment because of vacuum leaking. He spoke reminiscently that if he had knowledge of archives, he would have preserved Heliotron A machine itself since it was left uninjured in the office of physics department till he retired (see also the annual report by T. Mizuuchi in the chapter of archives of this issue). At that time his research laboratory, nuclear astrophysics group, had two major research themes: fusion in heavenly bodies and that on earth. However, unfortunately he quitted the

fusion research on earth because he reached the conclusion that it would take a long time until nuclear fusion would be realized. The interview record is being edited and will be archived in NIFS FSA.

In compiling chronology in this fiscal year, fusion reactor technology research, which started in 1970s, was also taken notice. Some important historical facts of fusion technology research are shown in Table II.

Table I. Time-line of early fusion research in Kyoto Univ.

time	Archival description
1955.2.1-15	The 1 st research meeting was held on nuclear phenomena in the cosmos at Yukawa Institute of Theoretical Physics. The lectures by astronomers were given, and it was discussed where the problems of nuclear phenomena in the cosmos exist from the various points of academic fields. The participants were Hayakawa, S., Taketani, M., Nakamura, S., Hatanaka, T., Ichianagi, J., Obi, S., Hayashi, C., and Yukawa, H. Theme: Model of inner structure and evolution of stars, Origin of elements and abundance, Energy production in the stars, Radio astronomy and source of cosmic ray
1955.10.24-25	The 2 nd research meeting of nuclear phenomena in the cosmos.
1956.04	Ultrahigh temperature research meeting in Kyoto Univ. was held, which was recognized as the first nuclear fusion research publicly
1958.04	Research on Heliotron A was started

Table II. Time-line of fusion technology research in Japan

	Evidence, Archival description, (NFSA ID No.)
1971.10	Investigation research activities on fusion reactor technology were started with 5 working groups, reactor core, heating, materials, tritium, and system in Atomic Energy Society of Japan (Saita, T., project leader) and The Institute of Electrical Engineers of Japan (Sekiguchi, T., project leader) (034-10)
1972	Hirsch, R.L. (Culham), Hancox, R. (DOE), and Kulchinsky, L. (Wisconsin Univ.) gave lectures on fusion reactor technology at Japan Atomic Industrial Forum meeting. (072-08)
1983	Japan-US Joint Planning Program on Fusion Technology was started. (035-03)
1988.06	Science Council of Japan submitted to MOE a petition calling for promoting research on fusion technology in universities, and new grant-in-aid scientific research for fusion science R & D from 1999. (029-30)
1999.04	NIFS, fusion engineering research center was established with main research fields of reactor materials and blanket. (15 years' history of NIFS)
2001.04	In The University of Tokyo, Advanced Energy Engineering Course, a new course of fusion technology was set up under collaboration with high-temperature plasma research center. (060-01-05)
2001.06	Japan Atomic Energy Commission decided to promote ITER in comprehensively pursuing nuclear fusion energy. (085-04-05)

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